

Listing of the Claims

1. (Currently Amended) A magnetic resonance imaging system (~~1~~) comprising
 - an acquisition module (~~2~~) for acquiring first magnetic resonance signals for a central portion of k-space using a first resonance frequency and for acquiring second magnetic resonance signals for a peripheral portion of k-space using a second resonance frequency,
 - a data module (~~3~~) for combining first k-space data corresponding to the first magnetic resonance signals and second k-space data corresponding to the second magnetic resonance signals to form a full k-space and
 - an image module (~~3~~) for generating an image by transformation of k-space to image space.

2. (Currently Amended) The system as claimed in claims 1, wherein the data module (~~3~~) for combining first and second k-space data are adapted to substitute the first k-space data for part of the second k-space data to form a full k-space.

3. (Currently Amended) The system as claimed in claim 1, wherein the data module (~~3~~) for combining first and second k-space data are adapted to add the first k-space data to the second k-space data to form a full k-space.

4. (Currently Amended) The system as claimed in claim 1, wherein the acquisition module (~~2~~) for acquiring first magnetic resonance signals are adapted to acquire signals from protons.

5. (Currently Amended) The system as claimed in claim 4, wherein the acquisition module (~~2~~) for acquiring first magnetic resonance signals are adapted to acquire signals from protons in another substance than H₂O.

6. (Currently Amended) The system as claimed in claim 1, wherein the acquisition module (~~2~~) for acquiring first magnetic resonance signals are adapted to acquire signals from non-proton nuclei.

7. (Currently Amended) The system as claimed in claim 6, wherein the acquisition module ~~(2)~~ for acquiring first magnetic resonance signals are adapted to acquire signals from hyperpolarized non-proton nuclei.

8. (Currently Amended) The system as claimed in claim 1, wherein the acquisition module ~~(2)~~ for acquiring first magnetic resonance signals are adapted to acquire signals from electron spins.

9. (Currently Amended) The system as claimed in claim 1, wherein the acquisition module ~~(2)~~ for acquiring second magnetic resonance signals are adapted to acquire signals from protons.

10. (Currently Amended) The system as claimed in claim 9, wherein the acquisition module ~~(2)~~ for acquiring second magnetic resonance signals are adapted to acquire signals from protons in H₂O.

11. (Currently Amended) A magnetic resonance imaging method, the method comprising the steps of

- acquiring ~~(9)~~ first magnetic resonance signals for a central portion of k-space using a first resonance frequency,
- acquiring ~~(10)~~ second magnetic resonance signals for a peripheral portion of k-space using a second resonance frequency,
- combining ~~(12)~~ first k-space data ~~(16, 19, 23)~~ corresponding to the first magnetic resonance signals and second k-space data ~~(15, 18, 22)~~ corresponding to the second magnetic resonance signals to form a full k-space ~~(17, 21, 24)~~ and
- generating ~~(13)~~ an image by transformation of k-space to image space.

12. (Currently Amended) A computer program comprising
- computer instructions to acquire first magnetic resonance signals for a central portion of k-space using a first resonance frequency,
 - computer instructions to acquire second magnetic resonance signals for a peripheral portion of k-space using a second resonance frequency,
 - computer instructions to combine first k-space data ~~(17, 19, 23)~~ corresponding to the first magnetic resonance signals and second k-space data ~~(15, 18, 22)~~ corresponding to the second magnetic resonance signals to form a full k-space ~~(17, 21, 24)~~ and
 - computer instructions to generate an image by transformation of k-space to image space,
- when the computer program is executed in a computer.